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AUTHOR Diggs, Laura L.
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ABSTRACT

This paper presents statistics from ongoing research on a unique learning environment developed at the University of Missouri-Columbia College of Education (MU-CoE). MU-CoE has developed a new approach to space devoted to learning, not teaching. This new concept of progressive learning and performance support integrates interactive networked technology with traditional media resources. The learning environment is based on the notion that learning takes place through providing appropriate facilities, equipment, software/hardware, and support staff. The environment encourages preservice teachers to become reflective practitioners. Data from surveys with user statistics, feedback from preservice teachers and other customers, and findings from student evaluation surveys indicate a strong need for a learning environment and human performance support system within teacher education programs and a strong need for technology in education. Usage of the learning environment increased steadily since its inception. The majority of respondents reported that the learning environment had a great effect on their learning and met their individual learning needs. Over half of the respondents used the learning environment resources daily or weekly. Two appendixes present data on learning environment usage by semester and data from student surveys. (SM)

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# Creating a Learning Environment for Pre-service Teachers

Laura L. Diggs, Ph.D.
University of Missouri-Columbia
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At most colleges and universities, space is aimed at supporting administration and teaching - not learning, as we know it today. Learning, defined as active engagement in authentic tasks, has not been given the same support and space that administration and classrooms have. Until recently, space allocation for administrative/faculty offices and teaching was the main emphasis at the University of Missouri-Columbia College of Education (MU-CoE). This has now changed. A new approach to space devoted to learning, not teaching, has been developed.

In the Fall of 1996, a new concept in space allocation specifically dedicated to a unique learning environment at the MU-CoE was implemented. This new concept of progressive learning and performance-support integrates interactive networked technology with traditional media resources. This learning environment is based on the notion that learning takes place through providing appropriate facilities, equipment, software/hardware, and support staff.

In an effort to determine the effectiveness of this unique learning environment, several aspects of research are ongoing. Surveys with user statistics, input, and feedback from our preservice teachers and other customers plays an important role in our every-evolving learning environment. This paper presents these statistics along with data findings of a student evaluation surveys given in the early Spring of 1999. At this time, the learning environment is 3 years old. We wanted to determine what affect the learning environment was having on the preservice teachers based on frequency of use and ability to meet their learning needs.

## Background

NCATE has mandated that teacher education programs prepare all teachers to use technology (Kahn, 1996). To prepare teachers to use technology, teacher education programs must provide institutional support for the use of technology in their teacher preparation programs. NCATE Guidelines recommend institutional support for the maintenance and use of technology:

- preservice teachers have training in and access to learning environments that provide education-related electronic information, video resources, computer hardware, software, and related technologies
- media, software, and materials collections are identifiable, relevant, and accessible
- sufficient library and technical staff available to support the learning and information acquisition with instructional materials collections and computer support.
- environment facilities and equipment are functional and well maintained.

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In a review of computer related literature of implications for preservice teacher education, Hirumi (1996) notes that several factors must be present in preservice teacher preparation programs for effective educational technology programs. Recommendations made include computer-related curriculum for preservice teacher preparation should be flexible and meet the needs of the individuals, be process oriented, provide practical frameworks to organize the knowledge base, provide levels of proficiencies, and be infused throughout preservice teacher preparation programs. But most importantly, these



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recommendations need to be structured around a human performance support system (HPSS) learning environment for long-term training and support. This means providing a learning environment with fellow "experts" who can serve as resources to successfully support and problem solve as the need arises.

In the past, learners at the MU-CoE and other universities have been largely responsible for supporting their own learning outside of the classroom; a study carrel in the library was a common form of learning support. When learning was thought of as "absorbing information," the notion of a learning support environment was simple -- create an environment that minimized distractions. We now understand learning to be a process that actively engages learners in constructing knowledge that can be used to solve real-world problems. Rather than minimal distractions, a learning support environment has the information, tools, and other resources needed to learn. Not surprisingly, models of such environments are rare in higher education. Consequently, an experimental enterprise was needed for developing, testing, and demonstrating learning support environments. (Wedman, Laffey, Musser, Andrews, Diggs, & Diel, 1998)

This unique learning environment began with the mission of the MU-CoE and the new undergraduate teacher development (UTD) program to provide space dedicated to supporting these goals. This mission involves building a human performance support system (HPSS) that will allow each student, and the professionals who work in and around schools, to achieve their full potential. The principles and practices that drive the work of the UTD program include a technology component that states "effective teachers use technology to support teaching, learning, assessment, professional development, and inquiry." Students are expected to use technology to communicate with others, share information, reflect, and engage in professional development.

One of the goals is that the MU-CoE become a leader in education through discovering, testing, and disseminating "ways of lifting the performance of K-12 students in the face of a rapidly changing world. Our success in this will be measured by the impact we make on Missouri's students. The hope for increased national stature is not the impetus of our work, it is simply a validation of what we've already decided to do."

The new undergraduate teacher development program is built around the model of the reflective practitioner. The central concept is the notion of reflection where effective teachers reflect on practices, evaluate results, and modify future practices. A reflective teacher is one who makes teaching decisions on the basis of conscious awareness and careful consideration, and the technical and educational consequences of those decisions. These decisions are made before, during, and after teaching actions.

## Functional Design

The functional design of The Reflector was originally based on an actual environment of approximately 7,000 square feet. This space includes dozens of computer networked stations (new Macintosh, Windows, and UNIX systems), Zip drives, color flatbed scanners, Wacom tablets, color printers, non-linear video editors, MIDI music creation station, presentation rooms, conference rooms, project rooms, desktop video conferencing, multimedia presentation systems, and a host of peripherals. The infrastructure is supported by 3 full-time specialists (1 Coordinator, 1 Assistant Coordinator, and 1 Technical Support Specialist) and 170 hours/week of part-time student workers. This environment also includes equipment available for check-out to faculty and their students, and instructional materials such as textbooks, videos, basals, kits, tests, and children's literature.

Consistent with MU-CoE mission and philosophy, the environmental design encourages learning, exploration, and collaboration. For example, the inviting physical environment includes plants, indirect

lighting, computer tables that are in learning clusters, tables and chairs for group work, small rooms and spaces for groups, and even bean bag chairs. A Math content area provides content-related computer resources, software, educational CD-ROMS, videos, and instructional materials.

Another component of The Reflector's functional design is the virtual aspect. The support and mission of The Reflector for the MU-CoE does not begin and end within our walls. The support to advance learning and technology includes an infrastructure of meeting needs at the time an individual or group are available, being accessible wherever that support is needed, and being adaptable to individuals and groups needing our resources and/or support. This includes being accessible on evenings and weekends with open hours, phone support, and email.

The Learning and Performance Support (LAPS) team is located in The Reflector and serves as the general technical support for the students, faculty, and staff in MU-CoE. They provide the direction and support needed to effectively integrate and advance technology in the MU-CoE.

## Results and Usage Statistics

The Reflector has seen a steady increase in usage since its doors opened on August 19, 1996. The average door count for Fall 1996 was 3,467/week. This is compared to 938/week at the Instructional Materials Center during Fall 1995. See Appendix A for tables with comparison data of usage statistics. For the two weeks prior to final exams, the average door count rose to 4,015/week. The total number of visitors for Fall 1996 was 45,076. Usage during Winter 1998 has continued to increase. As of April 1, 1998, the average door count for Winter 1998 was 3,800/week. This learning environment has proven to be very well accepted and a highly used resource.

In the Spring of 1998, surveys were sent to the MU-CoE students who were in the new UTD program (n=248). This involved the freshman and sophomores who were involved with the new technology component in the UTD. Students were asked to evaluate how effective they perceived The Reflector learning environment (staff and resources) in meeting their specific, individual needs. Based on a 5-point Likert scale, initial analysis of the data showed that 63% reported the learning environment as having a "great effect" on their learning and meeting their individual learning needs. Twenty-five percent reported the learning environment as having a "moderate" effect, where only 12% reported "little or no effect" on their learning. When asked how often the students used The Reflector resources for their specific learning needs, 58% reported using the resources "weekly to daily". Forty-three percent reported using The Reflector "seldom or never". Student interviews data reported (Appendix B) provides rich data to further determine the learning environment affect and improvements needed.

## Discussion

The technology infrastructure being built by the CoE has enabled us to take a leadership role in creating and using technology to support teaching, learning, and access to information. Modeled around the concept of "knowledge work environments", the infrastructure is:

1. helping prepare our students to use modern technologies;
2. facilitating increases in our external funding; and,
3. enabling us to provide unparalleled technical support.

Our hardware, software, and network decisions (over $1.7M) have efficiently and effectively integrated the CoE into the campus network while also electronically connecting with our professional

development school districts. Our technical support decisions have taught us the importance of "Right Time; Right Place; Right Form"; the Reflector along with our Learning And Performance Support Team (LAPS) has created a system where local assistance and working technology are expected.

Our next steps are to continue to gather and analyze data to determine specifically if we are meeting our mission and goals of the students and MU-CoE and areas of improvement.

## Implications

Data analysis and user statistics show a strong need for a learning environment and human performance support system within a teacher education program. Further, there is a strong need for technology in teacher education. Since we know that teachers tend to teach the way they are taught, strong modeling of technology and technology integration needs to happen and be supported.

The author feels that there are indications to look at the low or non-use of the learning environment to determine if there are further services that need to be offered. Also, we are currently looking at the faculty usage and faculty development side to see what support and services can be offered in this environment to meet their unique needs.

## References


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Appendix A

Reflector Usage by Semester
1995-present

| Academic Year | Weekly Count | Total Semester Count |
|---|---|---|
| Fall 1995 (IMC) | 938 | 15,946* |
| Spring 1996 (IMC) | Data unavailable | Data unavailable |
| Fall 1996 (Reflector Opens) | 3,467 | 45,076 |
| Spring 1997 | 4,401 | 74,810 |
| Fall 1997 | 5,043 | 85,521 |
| Spring 1998 | 5,182 | 87,187 |
| Fall 1998 | 5,295 | 90,017 |
| Spring 1999 | 2,970 as of 3/19/99 | 29,696 as of 3/19/99 |

Table 1 - This table shows the number of customers utilizing the Instructional Materials Center the year prior to the opening of the Reflector (1995-96) by semester. The numbers then show the increase in usage following the Reflector opening.

Reflector Usage by Academic Year
1995-present

| Academic Year | Weekly Count | Total Usage Count |
|---|---|---|
| 1995-96 (IMC) | 938** | 15,946* |
| 1996-97 (Reflector Opens) | 5,667 | 119,886 |
| 1997-98 | 7,634 | 172,708 |
| 1998-99 | 6,780 as of 3/19/99 | 119,713 |

Table 2 - This table shows the number of customers utilizing the Instructional Materials Center in 1995-96, the academic year prior to the Reflector opening its doors. The numbers then show the increase in usage following the Reflector opening.

*Figure estimated based on Fall data only.
**Data available for Fall semester 1995 only.

Fall 1998 Reflector Customer Survey Results

| | |
|---|---|
| Gender: | |
| Female | 73% |
| Male | 27% |
| Age: | |
| 17-24 years old | 74% |
| 26-35 years old | 20% |
| 36-45 years old | 3% |
| Over 45 years old | 3% |
| Affiliation: | |
| College of Education majors | 73% |
| College of Education undergraduates | 49% |
| Elementary Education majors | 31% |
| Library & Information Science majors | 12% |
| Early Childhood Education majors | 11% |
| Equipment Used: | |
| Computers | 100% |
| Instructional Materials | 34% |

Table 3 – This provides data from Reflector Customer Surveys reporting Reflector customer demographics and usage information.

Appendix B

Student Interviews

Students who entered the MU CoE in the Fall of 1996, the same time as the Reflector opened its' doors, were interviewed to see what impact they felt this environment had on their learning. The following are student responses from interviews:

Tell me about what impact you think the Reflector had on your education.

Student 1: To have some place that motivates me to learn and experiment from my mistakes has made a difference for me, I believe. I think that having the resources easily and readily available to me has accounted to increase my technology skills. Knowing that there is always someone around who either knows the answer to my question/problem, or knows who to go to and get that answer from is very crucial. I believe that the Reflector has had an incredible impact on my knowledge. First of all, they have been the "method to my madness" in that without this resource, I would have no outlet to explore and learn and be creative and productive with regards to technology. I think that knowing that there are people who are right there at my fingertips to ask those questions and get advice and peer input on is a large step of the battle. **The Reflector is more conducive to learning about technology and discovering different ways you could go about getting things done or tackling projects. This is where I think the Reflector's success is stemming from in a very major way!**

Student 2: MU's CoE is heavily technology based and immerses you with a "no fail" attitude. The emphasis is that everyone can do this and that it is beneficial to everyone. The Reflector has played a major part in my technology development because of the outstanding resources. Without the Reflector I would have never learned about all of the wonderful program that are out there and available to educators. Program like PowerPoint and Hyperstudio are great to use as a preservice teacher. What a wonderful way to integrate technology into teaching. The resources I found in the Reflector were top-notch. Tech support is some of the best and easy access to computers with all of the software I wanted or needed helped in my technology development. I believe if there had not been a Reflector, I would not have developed the technology skills and attitude I now have. There is no way I could be able to do the things I do on a daily basis now without the Reflector. I would be in the dark all the time instead of right on the edge of new software developments and programs and the newest equipment, all of which the Reflector offers.

Student 3: Just being constantly exposed and allowed to play with new technologies in the Reflector has had such an impact on my education and technology literacy. I think that without the Reflector, I would probably be using email and surfing the web, but I probably would not have ventured to learn how to create web pages on my own. I'm not sure that I would be looking beyond my skills to using the web as reference material for research and ways I can use technology in my future classroom.